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THE NORTH AMERICAN SPECIES OF *ANOROSTOMA* LOEW (HELOMYZIDAE; DIPTERA)

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ANOROSTOMA Loew

In American Museum Novitates No. 526 I gave a key to the species of *Anorostoma* but this, unfortunately, did not include all of the described species. In 1927, Abt. Leander Czerny[1] published a revised key to the genus, but in this case also some species were omitted. In my key, *jerseyi*, *coloradensis*, and *currani*, all described by Mr. C. B. D. Garrett, were omitted, while Abt. Czerny omitted *alternans* and *hinei* Garrett. After reading the descriptions and comparing them with specimens in the museum collection I find myself unable to identify positively several of the species described by Mr. Garrett, as the data given is too meager. Garrett failed to recognize *marginata* Loew and described the species again as *coloradensis*. It is obvious that several species have been confused under the name *marginata*, but they cannot be definitely separated by means of Garrett's descriptions. Several of the characters used by Garrett are variable, but to what extent this is true I cannot say. The length of the anterior frontal bristle is not absolutely constant, the mesopleural vitta varies in width and may be obsolete posteriorly, the number of sternopleurals is not constant and species that normally have two or more may have only one, while the hairs on the sternopleura vary. However, all of these characters have some value and I have used them in the key because they furnish the only indication of the identity of Garrett's species.

It is obvious that the correct identification of several of the species described by Garrett must await a careful examination of the types. My identifications of several of the species can be considered only as tentative, but I present as much information as I can in order that some one may be able to correct any errors.

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[1]Konowia, VI, p. 56.

TABLE OF SPECIES

1.—Wings whitish, with many brown and grayish spots....2.
Wings not whitish, the dark markings limited to the cross-veins and apex of the auxiliary vein....4.

2.—A black spot from the base of the antennae to the eye....3.
No such spot, rarely a rusty-reddish spot visible in some lights; frontals weak, not arising from dark spots....*cinereum* Curran.

3.—Mesonotum with four, the pleura with one brownish vitta..*opacum* Coquillett.
Mesonotum and pleura without vitta....*maculatum* Darlington.

4.—Abdomen yellowish red, without pollen; usually two or three strong sternopleurals....*alternans* Garrett.
Abdomen pollinose, never slightly shining....5.

5.—Mesonotum with very numerous brown spots, the disc appearing quite brown; sternopleura normally with two or more pairs of strong bristles....6.
Mesonotum cinereous or yellowish, at most the bristles arising from brown spots, the hairs rarely arising from rusty-reddish spots; only one strong sternopleural....7.

6.—Front brownish; posterior femora with a blackish spot toward the apex; pulvilli dirty white....*grande* Darlington.
Front reddish; posterior femora wholly reddish; pulvilli yellowish..*wilcoxi*, n. sp.

7.—Mesopleura with a very broad rusty-reddish vitta above which extends to the upper margin....11.
Mesopleura rarely somewhat darkened above, never with a broad vitta extending to the upper margin....8.

8.—Mesopleura dark below; cross-veins with blackish clouds....*currani* Garrett.
Mesoplura either with a dark vitta above, separated from the upper edge, or wholly pale, never darkened below; cross-veins with pale clouds....9.

9.—Sternopleura with a single row of hairs along the middle....*jersei* Garrett.
Sternopleura with two rows of hairs down the middle....10.

10.—Acrostical hairs in a single, irregular row, the hairs of the mesonotum very sparse; front with white pollen above....*carbona*, n. sp.
Acrostical hairs in two rows and with additional scattered hairs between the dorsocentrals, the mesonotal hairs moderately numerous; front with cinereous-yellow pollen on upper half and only a little white pollen laterally. *marginata* Loew.

11.—Two rows of hairs down the middle of the sternopleura....*hinei* Garrettt.
A single row of hairs down the middle of the sternopleura....*lutescens*, n. sp.

Anorostoma cinereum Curran

CURRAN, 1932, Amer. Mus. Novit., No. 526, p. 10 (f).

In addition to the type series I have before me six males and five females taken at Boiler Bay, Oregon, on May 18, 1930. Type in American Museum of Natural History.

In the original description it was stated that the bristles of the thorax did not arise from black spots and this is true in most cases.

However, some specimens have distinct black or brown spots at the bases of the mesonotal bristles, but none have black spots on the front, and the frontal bristles are weaker than in allied forms. The gray wing-spots are less numerous than in the other species also but there is some variation in their extent.

Anorostoma maculatum Darlington

DARLINGTON, 1908, Trans. Amer. Ent. Soc., XXXIV, p. 76.
CZERNY, 1924, Abh. zool.-bot. Gesselsch., Wien, XV, p. 115.

Darlington described this species from a large series taken by Dr. Aldrich at Pacific Grove, California, on May 9. I have before me one male, Monterey Co., California, July 5, 1896 (Wheeler Collection). Type in U. S. National Museum.

In general appearance *maculatum* is very similar to the more northern *cinereum* but the presence of the black frontal spots, stronger frontal bristles and the black spot between the antennae and eye are characteristic.

Anorostoma opacum Coquillett

COQUILLETT, 1901, Proc. U. S. Nat. Mus., XXIII, p. 614.
CZERNY, 1924, Abh. zool.-bot. Gesellsch., Wien, XV, p. 114.

I have not seen this species but it is very distinct from the two foregoing. The head is as in *maculatum* but the mesonotum bears four and the pleura a single brown vitta and the wings are more spotted. The species was described from a single female from Los Angeles Co., California. Type in U. S. National Museum.

Anorostoma alternans Garrett

GARRETT, 1925, 'Seventy New Diptera,' p. 4.

Described from Normal, Washington, May, the type in the Garrett Collection. Three females from Boiler Bay, Oregon, May 18, 1930 (J. Wilcox).

This species is readily recognized by its black, cinereous pollinose thorax and the rusty-reddish, non-pollinose abdomen. In the specimens before me the number of sternopleurals varies from one to three. The wings have a strong luteous tinge, with the cross-veins clouded with brown.

Anorostoma grande Darlington

DARLINGTON, 1908, Trans. Amer. Ent. Soc., XXXIV, p. 75.
CZERNY, 1924, Abh. zool.-bot. Gesellsch., XV, p. 113.

Originally described from a single male from Pacific Grove, California, May 9. Type in U. S. National Museum.

The species is unknown to me but is very similar to the following. It may be that *A. wilcoxi* is the same but none of my specimens agree with Darlington's description.

Anorostoma wilcoxi, new species

A large brownish looking species, the abdomen black with cinereous pollen, the genitalia reddish; sternopleura with from one to four strong bristles. Length, 5.5 to 7 mm.

MALE.—Face and cheeks yellowish, whitish pollinose; front reddish, becoming yellow in front, the pollen brownish yellow near the ocelli; anterior frontals about half as long as the posterior pair; ocellars long; frontal hair black, limited to the anterior half of the front where it is moderately abundant; occiput black behind the eyes, cinereous pollinose, the hair coarse and black. Cheeks almost as wide as the eye-height, with a row of bristly hairs below; vibrissae strong; palpi yellow, with sparse, short bristles. Antennae reddish, the third segment short oval; arista brown, with paler area just beyond the thickened base. Eyes longitudinally oval; a darkened spot along the orbit between the face and front.

Thorax apparently dark in ground color; pleura and pectus cinereous pollinose, the mesopleura broadly yellowish brown above. Mesonotum cinereous pollinose but each hair arises from a brown spot so that the disc of the mesonotum appears yellowish brown; the bristles each arise from a blackish spot. Scutellum cinereous pollinose, the bristles arising from large brown spots; the brown spots may be connected, leaving the middle and narrow sides of the scutellum cinereous. Behind the propleural bristle there may be a bristle and one or two hairs, or only three or four hairs. Sternopleura with from one to four bristles and with numerous, moderately long hairs in the middle.

Legs reddish, cinereous pollinose, the anterior femora sometimes dark in ground color. Anterior femora with two partial rows of bristles posterodorsally, with long hairs ventrally and with a row of rather weak ventral bristles that become hair-like and sparse toward the base; middle femora with two anterior bristles beyond the middle and a row of four to six weaker bristles above them, ventrally with long black hair on the basal half, the apical half with a row of short, stout posteroventral bristles; posterior femora with moderately long hair below and two irregular rows of anterodorsal bristles on the apical half. Middle tibiae with three strong apical bristles and five weak ones; posterior tibiae with soft, short hair ventrally and with a single apical bristle situated posteroventrally. First segment of the posterior tarsi somewhat swollen, not or scarcely longer than the second segment, on the apex of the under surface toward the posterior edge with a very short, stout curved black spine.

Wings with strong luteous tinge, the cross-veins and apex of the auxiliary vein strongly clouded with brown; veins yellowish and brown; in some lights the wings show white spots in the apical cell beyond the anterior cross-vein, in the first basal before the anterior cross-vein and just beyond the anal cell. Squamae and halteres yellow.

Abdomen black, thickly cinereous pollinose, the segments each with two to four marginals laterally, the row on the fifth segment almost complete. Genitalia reddish, with cinereous-yellow pollen, the basal dorsal plate black in ground color and with

very short hairs above in the apical part; hair on the genitalia almost as long as the upper plate. Venter dark, cinereous pollinose.

FEMALE.—Front and middle femora with shorter hair below, the middle pair with three bristly hairs on the basal third; first segment of the posterior tarsi as long as the following two segments combined, without curved spine at apex but with two short bristles. Fifth abdominal segment more or less brownish red, the following segments reddish; ovipositor with several short spines above.

TYPES.—Holotype, male, allotype, female, Boiler Bay, Oregon, March 30, 1930. Paratypes: eleven males and three females, Boiler Bay, March 9, 30, and May 18, 1930, all collected by J. Wilcox, and one male, Corvallis, Oregon, April 1, 1930, collected by Itel Wilcox.

In *grande* Darlington the front is described as brown, the antennae brown, the mesonotum light brown with darker brown spots, the scutellum reddish brown, and the posterior femora exceptionally stout.

Anorostoma currani Garrett

GARRETT, 1922, Ins. Ins. Mens., X, p. 176.
CZERNY, 1927, Konowia, VI, p. 37.

Described from a single male collected by Dr. A. J. Hunter at Teulon, Manitoba, Canada, August 28, 1920. Type in Garrett Collection.

This species is wholly yellowish, the mesonotum with only a few short black hairs and the pleura darkened below. The anterior frontal bristle is about one-third as long as the posterior frontal. Genitalia with long and abundant hairs. Posterior femora with a row of bristles below. Cross-veins clouded with brown.

The significant facts in the description are mentioned above and the presence of distinct bristles on the posterior femora is distinctive. One or two of the species have short bristly hairs toward the apex of the anteroventral surface but these are not conspicuous.

Anorostoma jersei Garrett

GARRETT, 1924, Ins. Ins. Mens., XII, p. 29.
A. jerseyae CZERNY, 1927, Konowia, VI, p. 37.

It seems to be impossible to recognize this species from the description. It is compared with *coloradensis* Garrett (*marginata* Loew) and appears to be nothing more than a large specimen of that species. Garrett states that the hypopygium is on a slide. There is apparently a rather narrow rusty-brownish vitta near the upper edge of the mesopleura but this character is variable in *marginata*. The presence of only a single row of hairs down the middle of the sternopleura, more hairy mesonotum, etc., are characters given by the author for the separation of this species from *coloradensis*.

Anorostoma marginata Loew

Loew, 1862, Berl. Ent. Zeitschr., p. 243.
A. coloradensis Garrett, 1924, Ins. Ins. Mens., XII, p. 28.
A. coloradiniense Czerny, 1927, Konowia, VI, p. 37.

I have before me more than thirty specimens of this species. Most of them are from Pagosa Springs, Colorado, while some are from Bradore Bay, Quebec, Canada. The types of *coloradensis* are apparently in the Garrett Collection.

Three of my Colorado specimens are apparently from the same lot as Garrett's types and I have seen others in the collection of the University of Colorado bearing similar numbers. The numbers refer to cages in which experiments were being conducted and the specimens were distributed several years ago. Loew's description of *marginata* agrees perfectly with the specimens before me, except that the abdomen is blackish or brownish in ground color although in some specimens it does not appear to be much darker than the mesonotum, so dense is the pollen.

Owing to the uncertainty regarding the identity of *marginata* I have delayed the publication of this paper for several months and am now able to establish as a fact the suspected synonymy of *coloradensis*. Loew described *marginata* from two males and one female, and these specimens are now in the Museum of Comparative Zoölogy. All three are unusually light-colored specimens and the males are unusual in that they have only a broad, incomplete median vitta on the mesonotum black in ground color, while the abdomen also bears a broad black median vitta. The sternites are wholly yellowish. None of my specimens will exactly match the types, but one male comes very close while a few approach the male types in color. Most male specimens have the mesonotum mainly black in ground color and the abdomen mostly black, but the females are much more extensively pale.

In the large series taken at the same time in Colorado I find a good deal of variation. The distance between the frontal bristles varies somewhat and so does the length of the anterior one, while in one specimen the anterior frontals are absent. In some specimens there is only a single row of hairs down the middle of the sternopleura, in others two rows, while in some there is one row on one side and two on the other. The dark vitta toward the upper border of the mesonotum may be entire or it may be obsolete on the posterior half or more, and there is variation in regard to the bristles on the upper surface of the anterior femora.

The description of *carbona*, new species, will apply fairly well to the specimens referred to this species but in *marginata* there are two rows of

acrostical hairs with many additional scattered ones between the dorsocentrals; the basal portion of the genitalia is much smaller so that much more of the following section is visible from dorsal view and there are no long hairs on the middle tibiae. In the females the abdomen is sometimes mostly reddish yellow in ground color.

Anorostoma carbona, new species

Blackish, thickly cinereous pollinose, the head, legs and genitalia reddish or yellowish in ground color. Length, 5 mm.

MALE.—Face and cheeks yellowish, with whitish pollen; front reddish, paler anteriorly, the anterior frontals hardly half as long as the posterior pair; ocellars long; occiput with only two or three hairs on either side just above the neck; cheeks half as wide as the eye-height, with a row of hairs below; vibrissae rather fine. Palpi yellow, with short, black, bristly hairs. Antennae reddish, the third segment obtusely oval; arista reddish brown.

Thorax black in ground color, the humeri, scutellum and the broad anterior border of the pleura yellowish. Mesonotal hairs very sparse, only a single irregular row between the dorsocentrals, although there may be one or two paired hairs, the hairs arising from small brown spots. One or two very short hairs behind the propleural bristle; one sternopleural and only a single row of hairs along the middle of the sternopleura.

Legs reddish yellow; anterior coxae with at most a row of short hairs on the anterior surface in addition to the bristles. Anterior femora with a row of very fine posteroventral bristles, a few long hairs below and a row of dorsal bristles with only two or three fine, short bristles behind; middle femora without distinct bristles below but with a row of long hairs and some additional long hairs toward the base; posterior femora without bristles below but with fairly long hairs laterally, on the dorsal surface with a row of four or five bristles toward the anterior surface on the apical half and one dorsal bristle. Middle tibiae with moderately long hair posteriorly toward the apex and with three strong and five weak apical bristles. Basal segment of the posterior tarsi a little longer than the second, the short apical spine rusty reddish.

Wings with grayish tinge, the cross-veins faintly clouded, the usual whitish spot present adjacent to the anal cross-vein. Squamae cinereous white, the halteres yellow.

Abdomen blackish in ground color, cinereous pollinose, the second to fourth segments with marginals only laterally, the fifth with an apical row; apices of the segments yellow. Genitalia reddish yellow, the basal section very large when seen from above, almost equal to the visible portion of the following section, and bearing very few tiny hairs; hair on genitalia moderately long but not abundant.

TYPES.—Holotype and three paratypes (males) from Carbon Co., Wyoming.

This species is very similar in appearance to *marginata* Loew, but the presence of so few mesonotal hairs and the unusually large basal section of the genitalia will at once separate *carbona* from that species.

Anorostoma hinei Garrett

GARRETT, 1925, 'Seventy New Diptera,' p. 4.

Described from a number of females from Alaska, collected by Dr. Hine during July and August. Types in Ohio State Museum and Garrett Collection. I have a single female from Arizona, Bear Wallow, Santa Catalina Mts., July 12–17, 1916 (F. E. Lutz), that agrees perfectly with the description.

This form agrees with the preceding, differing only in having the brownish stripe on the mesopleura wider and only very narrowly separated from the upper edge on the posterior half. I do not think it is anything more than a color form of *marginata*.

Anorostoma lutescens, new species

Reddish yellow in ground color and thickly pollinose; hairs of the mesonotum arising from rusty-reddish spots. Length, 6 mm.

MALE.—Face and cheeks yellow in ground color, white pollinose; front reddish, broadly darker across the vertex; anterior frontal bristles hardly half as long as the posterior pair; ocellars long; hairs on the occiput near the neck abundant; cheeks two-thirds as wide as the eye-height, with two hairs below on either side; vibrissae slender. Palpi yellow, with black bristly hairs below. Antennae reddish; third segment short oval; arista brown, pubescent.

Mesonotum cinereous-yellow pollinose, the hairs numerous and arising from rusty-reddish spots; in the middle with a pair of rusty-reddish vittae which are fused in the middle and not regularly separated anteriorly, slightly diverging and broadened posteriorly and extending over the scutellum which is broadly yellow in the middle and narrowly so on the sides and apex. Between the dorsocentrals the hairs are arranged in six irregular rows. Behind the propleural bristle a single hair; one sternopleural bristle; on one side a single row of hairs down the middle of the sternopleura, on the other, a complete row and a partial second.

Legs reddish; anterior coxae with very few hairs on the anterior surface except at the apex; anterior femora with a row of posteroventral bristles, those on the basal two-thirds hairlike, the hair rather short, on the upper surface with a row of bristles and behind these a second, incomplete row of short, weak bristles; middle femora with rather long hair on the basal half and with a row of posteroventral bristles which are hairlike on the basal half; posterior femora with rather abundant hair below, a row of hairs on the apical third of the anteroventral surface slightly longer and bristle-like, three near the base of the posteroventral surface about twice as long as the rest of the hair, on the apical half of the upper surface toward the anterior side with five or six bristles arranged in two rows; middle tibiae with three strong and five weak apical bristles; first segment of the posterior tarsi a little longer than the second, the apical curved spine yellow with a black tip.

Wings with grayish tinge, the apex of the auxiliary vein and the cross-veins with dark brown clouds, that on the posterior cross-vein less distinct; beyond the anal cell a white spot. Squamae and halteres yellow.

Abdomen wholly pale; marginal bristles moderately long, absent on the middle of the segments. Genitalia paler than the abdomen, the hair rather sparse.

TYPE.—Male, Boiler Bay, Oregon, May 18, 1930 (J. Wilcox).

This species is rather similar to *currani* but it is evidently separable by the color of the thorax and by having coarser sparse hair on the hypopygium.